Log Event A

Borehole # 10-04-05

Borehole Information

Farm : A	**Tank :** A-104	**Site Number :** 299-E25-63
N-Coord : 41,275	**W-Coord :** 47,768	**TOC Elevation :** 688.43
Water Level, ft :	**Date Drilled :** 4/30/1962	

Casing Record

Type : Steel-welded	Thickness, in. : 0.280	ID, in. : 6
Top Depth, ft. : 0	Bottom Depth, ft. : 125	

Borehole Notes:

This borehole was drilled in April 1962 to a depth of 75 ft using 6-in.-diameter casing. In November 1976, the borehole was deepened to 130 ft and completed at a depth of 125 ft. There is no indication in the driller's log or Chamness and Merz (1993) that the borehole was perforated or grouted.

There is no casing size indicated in the driller's log. For this report, the 6-in.-diameter casing was used to process the SGLS data. It is assumed the casing thickness is 0.280 in., on the basis of the published thickness for schedule-40, 6-in. pipe, as observed by the logging engineer.

The top of the casing is the zero reference for the SGLS. The casing lip is even with the ground surface.

Equipment Information

Logging System : 1	**Detector Type :** HPGe	**Detector Efficiency:** 35.0 %
Calibration Date : 04/1996	**Calibration Reference :** GJPO-HAN-5	**Logging Procedure :** P-GJPO-1783

Logging Information

Log Run Number :	1	**Log Run Date :**	09/23/1996	**Logging Engineer:**	Alan Pearson
Start Depth, ft.:	0.0	**Counting Time, sec.:**	100	**L/R :** L	**Shield :** N
Finish Depth, ft. :	5.0	**MSA Interval, ft. :**	0.5	**Log Speed, ft/min.:**	n/a

Log Run Number :	2	**Log Run Date :**	09/23/1996	**Logging Engineer:**	Alan Pearson
Start Depth, ft.:	123.0	**Counting Time, sec.:**	100	**L/R :** L	**Shield :** N
Finish Depth, ft. :	34.0	**MSA Interval, ft. :**	0.5	**Log Speed, ft/min.:**	n/a

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Log Run Number :	3	**Log Run Date :**	09/25/1996	**Logging Engineer:**	Alan Pearson
Start Depth, ft.:	35.0	**Counting Time, sec.:**	100	**L/R :** L	**Shield :** N
Finish Depth, ft. :	4.0	**MSA Interval, ft. :**	0.5	**Log Speed, ft/min.:**	n/a

Logging Operation Notes:

This borehole was logged in three log runs. The total logging depth achieved with the SGLS was 123 ft.

Analysis Information

Analyst : R.R. Spatz

Data Processing Reference : MAC-VZCP 1.7.9 Analysis Date : 03/24/1998

Analysis Notes :

The pre- and post-survey field verification spectra for all logging runs met the acceptance criteria established for peak shape and system efficiency. The energy calibration and peak-shape calibration from these spectra were used to establish the peak resolution and channel-to-energy parameters used in processing the spectra acquired during the logging. There was negligible drift during the logging operation. It was not necessary to adjust the system gain to maintain correct peak identification.

A casing correction factor for 0.280-in.-thick casing was applied to the log data during the analysis process.

Shape factor analysis was applied to the SGLS. Insights are provided into the distribution of radionuclide contaminants and into the nature of zones of elevated gamma-ray activity not attributable to gamma-emitting radionuclides.

Log Plot Notes:

Separate log plots show the man-made and the naturally occurring radionuclides. The natural radionuclides can be used for lithology interpretations. The headings of the plots identify the specific gamma rays used to calculate the concentrations. Uncertainty bars on the plots show the statistical uncertainties for the measurements as 95-percent confidence intervals. Open circles on the plots give the MDL. The MDL of a radionuclide represents the lowest concentration at which positive identification of a gamma-ray peak is statistically defensible.

A combination plot includes the man-made and natural radionuclides, the total gamma derived from the spectral data, and the Tank Farms gross gamma log. The gross gamma plot displays the latest available digital data. No attempt has been made to adjust the depths of the gross gamma logs to coincide with the SGLS data.

A plot of the shape factor analysis results is also included. The plot is used as an interpretive tool to help determine the radial distribution of man-made contaminants around the borehole.

Results/Interpretations:

The only man-made radionuclide detected around this borehole was Cs-137. Cs-137 contamination was detected continuously from the ground surface to 15 ft at concentrations ranging from 0.2 (MDL) to 5 pCi/g.

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The maximum Cs-137 concentration was 5 pCi/g at 1 ft. Cs-137 contamination was detected continuously from 24 to 28 ft at concentrations ranging from the MDL to 1 pCi/g. Cs-137 contamination occurs just above the MDL at 41 ft and intermittently from 49 to 75 ft. At the bottom of the borehole, Cs-137 contamination was detected from 121.5 to 123 ft at concentrations ranging from 1 to 5 pCi/g.

The K-40 concentrations decrease at 24 ft from a general background of about 16 pCi/g above this depth to about 13 pCi/g between 24 and 74 ft. Below 74 ft, the K-40 concentrations increase to a general background of about 17 pCi/g and remain at about this concentration to the bottom of the borehole. The concentrations of U-238 and Th-232 increase at 74 ft.

An analysis of the shape factors associated with applicable segments of the spectra was performed. Comments on the interpretation of the shape factor results are presented in the Tank Summary Data Report for tank A-104.